UNITED STATES PATENT OFFICE

2,035,471

PROPELLENT POWDER

George C. Hale and Donald R. Cameron,
Dover, N. J.

No Drawing. Original application March 20, 1934, Serial No. 716,512. Divided and this application September 18, 1935, Serial No. 41,110

2 Claims. (Cl. 52—5)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to a propellent powder, and is a division of copending application, Serial No. 716,512 filed March 20, 1934.

The requirements of a propellent powder for military weapons are low volatility, resistance to moisture absorption and chemical decomposition, smokelessness, and flashlessness.

It is recognized by those experienced in the preparation of propellent powders that no powder has been produced to date which fulfills all the requirements above cited to the desired degree under all circumstances. Thus a particular powder may be acceptable for use because it offers advantages in fulfilling one or more of the requirements above mentioned even though it does not offer any particular advantage with respect to other of the requirements, but although acceptable, such a powder is obviously not all that is to be desired.

One of the principal difficulties in preparing powders which yield no flash at the muzzle of guns resides in the fact that the common methods of eliminating flash involve the addition to the powder composition of ingredients which have the objectionable tendency of producing smoke when the powder is fired. The user is, therefore, confronted with the problem of choosing between a powder which flashes but produces a minimum of smoke and a powder which is flashless but produces more smoke than is really desired.

The purpose of this invention is to provide a non-hygroscopic, non-volatile and stable nitrocellulose propellent powder which is absolutely flashless and produces less smoke than powders heretofore in use. This purpose is accomplished by incorporating in the powder composition a relatively small amount of triacetin. The triacetin is the pure product or mixtures of it with small amounts of diacetin and monacetin such as are obtainable commercially under the name triacetin.

It has been found by firing powders made from compositions containing nitrocellulose and triacetin that the triacetin is very efficient in reducing the flash from the nitrocellulose powders and at the same time yields only a thin, fugitive smoke which is decidedly less visible than that produced by any other flashless powders. An example of a composition is given which has been thoroughly tested in 37 m/m and 75 m/m military weapons and found to be not merely satisfactory but distinctly superior to other flashless powders from the standpoint of the amount of smoke produced when flashlessness is consistently obtained.

	Per cent
Nitrocellulose	90
Triacetin	10

The composition is cited as representative but not limiting since various proportions of the constituents have been employed in powders and their relative behavior established. It is to be understood that variations in the proportion of the constituents are necessary when adapting the powders to specific weapons since the optimum proportion for one weapon may not be the optimum for another weapon. It is clearly recognized by those experienced in the prepartion of propellent powders that the problem of eliminating flash is much greater with some weapons than others. The length of the tube or barrel of the gun is one factor since a long tube permits greater radiation of heat from the gases before they issue from the muzzle and it is therefore easier to reduce the temperature of the gases below their inflammation temperature by the flash reducing agent employed in the powder. Thus with some weapons which have a long tube and require relatively small amount of propellent powder to meet ballistic requirements, the addition of 2% triacetin may be sufficient to eliminate flash while with a gun or howitzer which has a short tube and requires a much larger amount of propellent charge, 5% or even 10% of the triacetin may be needed. If the percent of this constituent is varied the percentage of the nitrocellulose must of course be changed accordingly.

We claim.

1. A propellent powder consisting of nitrocellulose and triacetin two to ten percent.

2. A propellent powder consisting of nitrocellulose and triacetin.

GEORGE C. HALE.
DONALD R. CAMERON.